

Remarks

Reconsideration of the rejection of claims 1-14 is requested. Claims 15-17 have been added by this amendment.

A letter to the office drafts person is included along with corrected sheets 6 and 7 of the drawing. It will be noted that former Figs 8A and 8B have been deleted, and former Figs 9A and 9B are now designated as Figs 8A and 8B. The specification has also been amended to reflect this change. The change is being made to correct obvious errors in the discussion of the invention relating to the drawings. The specification has also been amended to correct further obvious errors. No new matter has been inserted.

Claims 1-9 and 12-14 stand rejected under 35 USC 102(e) as being anticipated by U.S. Patent No. 6,060,380 issued to Subramanian et al. Claims 10-11 stand rejected under 35 USC 103(a) as being unpatentable over Subramanian et al in view of U.S. Patent No. 6,162,587 issued to Yang et al.

Subramanian et al is directed to forming trench lines (116) and via holes (110) in a dual damascene process using silicon oxynitride as a hard mask (402). A first photoresist (404) is patterned to ultimately define the trench line (116) in a top insulating layer (118), and a second photoresist (406) is patterned to ultimately define the via hole (110) in a bottom insulating layer (112). Hardmasks (302, 304, and 402) are also used to define the features.

Examiner has contended that Subramanian et al thereby teaches the claimed steps of applicants' invention. In the first response by applicants, it was argued that Subramanian et al did not in fact teach photodefining a second elongated opening across the trench as required by the claims. Applicants also quoted the present specification at page 6, line 3-4 where it is stated that "The slit is preferably transverse and perpendicular to the trench..."

In the final rejection, Examiner argued that the features on which applicants rely (transverse and perpendicular to the trench) were not recited in the rejected claims. Examiner maintained that the requirement of “across the trench” which was recited in the claims could be interpreted as “through the trench”. Examiner further noted that Subramanian et al shows a first pattern defining trench lines in a first insulating layer, and a second pattern defining via holes in a second insulating layer.

The claims have been amended to more clearly define the invention over the cited art. It will be noted that claims 1 and 13 now provide that the second elongated opening e.g., 17,19) is transverse to the trench (e.g., 13), while claim 14 provides that the second elongated opening is transverse to the first elongated opening (e.g., 11). This change finds support in the specification at page 6, lines 3-4. Claims 1 and 13 now also provide that the exposed portion of the dielectric (1) is defined by the intersection of the first and the second openings. This change finds support, for example, at page 4, lines 17-29, and Figs 6A-6C.

It will be noted, first, that Subramanian et al does not show a second elongated opening at all. Rather, his via hole (110) is a square defined by the pattern in a second photoresist (406). (See, e.g. Figs 2 and 4C). There is no evidence that the pattern in the photoresist or the hardmasks is anything other than a square. Second, there is no teaching that the second opening, even if it were elongated, would be “transverse” to the trench or to the first opening as used in this specification and now included in the claims. Clearly, one of the main features of the invention is the fact that the via hole is defined by the intersection of elongated mask openings. (See, e.g., page 2, lines 19-24 of the present specification.) Thus it is necessary that the second opening is set crosswise with respect to the trench. This is one of the standard definitions for the term “transverse”. (See, e.g., Webster’s Ninth New Collegiate Dictionary, Merriam-Webster 1990.) While Examiner has correctly pointed out that the term “across” the trench can mean “through” the trench, this is clearly not what the term means in light of the specification. Thus, the term “transverse” has been substituted in an attempt to convey the meaning in the context of this application. Further, claims 1 and 13 now explicitly recite the definition of the via or contact opening by the intersection of the first and second openings. No such definition is taught by Subramanian et al.

It is submitted in view of the above that claims 1, 13, and 14 should be allowable. Since these claims are allowable, claims 2-12, which are dependent on claim 1, should also be allowable without the need for further discussion

It will also be noted that claims 15-17 have been added by this amendment. These claims, dependent upon claims 1, 13, and 14, respectively, add the further feature that the second opening is perpendicular to the first opening. This feature also finds support in the specification at page 6, lines 3-4. Clearly there is no such teaching in Subramanian et al., and allowance of these claims should be given favorable consideration.

Passage to issue is requested.

Applicants' attorney wishes to thank the Examiner for the many courtesies extended during a phone conversation on November 16, 2005. While no agreement was reached, Examiner's effort to clarify the issues is appreciated.

Respectfully Submitted,



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Dated: 11/25/05